

and Power Assignment:
Calculating Work:

$$W = Fd$$

1. A book weighing 1.0 N is lifted 2 m. How much work was done?

$$W = (1.0\text{ N})(2\text{ m}) = 2\text{ J}$$

2. A force of 15 N is used to push a box along the floor a distance of 3 m. How much work was done?

$$W = (15\text{ N})(3\text{ m}) = 45\text{ J}$$

3. It took 50 J to push a chair 5 m across the floor. With what force was the chair pushed?

$$\frac{50\text{ J}}{5} = F \left(\frac{5\text{ m}}{5} \right) \quad F = 10\text{ N}$$

4. A force of 100 N was necessary to lift a rock. A total of 150 J of work was done. How far was the rock lifted?

$$\frac{150\text{ J}}{100} = \frac{100\text{ N}(d)}{100} \quad 1.5\text{ m}$$

5. It took 500 N of force to push a car 4 m. How much work was done?

$$W = (500\text{ N})(4\text{ m}) = 2000\text{ J}$$

6. A young man exerted a force of 9,000 N on a stalled car but was unable to move it. How much work was done?

no work done

Calculating Power

$$P = \frac{W}{t} \leftarrow Fd \quad P = \frac{Fd}{t}$$

1. A set of pulleys is used to lift a piano weighing 1,000 N. The piano is lifted 3 m in 60 s. How much power is used?

$$P = \frac{(1000\text{ N})(3\text{ m})}{60\text{ s}} = 50\text{ W}$$

2. How much power is used if a force of 35 N is used to push a box a distance of 10 m in 5 s?

$$P = \frac{(35\text{ N})(10\text{ m})}{5\text{ s}} = 70\text{ W}$$

3. What is the power of a kitchen blender if it can perform 3,750 J of work in 15 s?

$$P = \frac{3750\text{ J}}{15\text{ s}} = 250\text{ W}$$

4. How much work is done using a 500 W microwave oven for 5 mins.

$$\frac{5\text{ min} \times 60\text{ sec}}{1\text{ min}} = 300\text{ s}$$

$$P = \frac{W}{t}$$

$$500\text{ W} = \frac{W}{300\text{ s}} \times 300$$

5. How much work is done using a 60 W light bulb for 1 hour?

$$W = 150,000\text{ J}$$

$$\frac{1\text{ hr} \times 60\text{ min} \times 60\text{ s}}{1\text{ hr} \times 1\text{ min}} = 3600\text{ s}$$

$$P = \frac{W}{t}$$

$$60\text{ W} = \frac{W}{3600\text{ s}} \times 3600$$

$$216,000\text{ J}$$